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23 March 2022

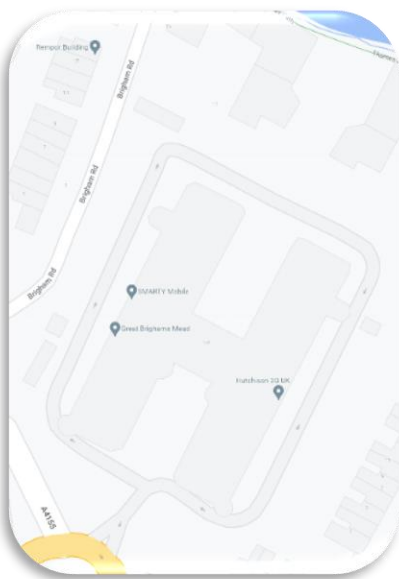
King's Oak Capital
52 High Street
Harrow
HA1 3LL

GREAT BRIGHAMS MEAD, 1 VASTERN ROAD, READING, RG1 8DJ – EXTENSION

King's Oak Capital is seeking planning permission to add two storeys of residential accommodation to this office block and appointed Michael Barclay Partnership to review and comment on the construction, condition and capability of the building's structure to accommodate this extension and Malcolm Brady BEng CEng MStructE attended on February 23rd, 2022, to undertake a visual survey and inspection of the property.

THE EXISTING BUILDING

Great Brighams Mead is a relatively recent building and has a construction that has been common and popular for office developments over the last 20 years or so, i.e. structural steel frame supporting reinforced concrete floor slabs cast on profile metal decking: the slabs span between long-span cellular steel beams that, in this case, span the full width of the blocks to provide column-free spaces. It is likely that there is composite connection between the slabs and beams to both contribute to the performance of the beams and create stiff, diaphragm floor plates that form part of the stability system centred around the lift and stair cores.



The building is arranged over three levels, including the ground floor and has no basement or subterranean areas. The building is set out to resemble, on plan, the letter H and the plant room is provided within the pitched roof of the crossbar where the floor is also reinforced concrete; the west wing has a lightweight flat roof while the east wing has an inaccessible pitched roof supported by steel trusses.

MEMBERS

Principals

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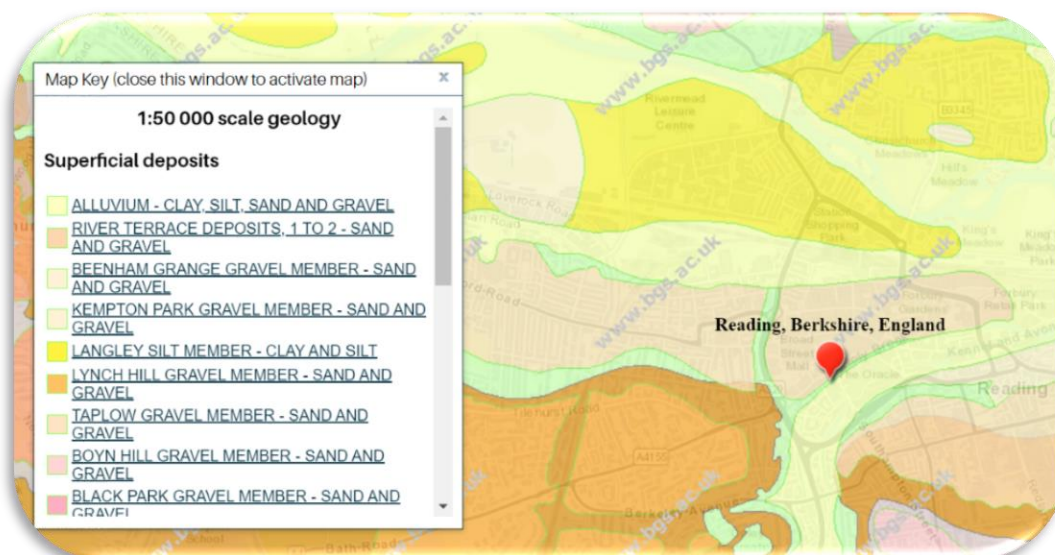
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THE LOCAL GEOLOGY

Geologically, the area is underlain by the Langley Silt Member, a deposit of clay and silt that is cohesive and firm but not a stratum capable of supporting the substantial foundation loads that the structure of Great Brigham Mead will generate so it is highly likely that the building is supported by deep piles. It is unlikely that the piles will penetrate as far as the bedrock Seaford Chalk Formation beneath the clay.



Historical investigations available from The BGS near this site struck and recorded groundwater at around 2.5m below ground level, which is not unusual so close to the River Thames, and it may have been the control and management of this that precluded a basement to this development.

DESIGN STANDARDS FOR THE EXISTING STRUCTURE

At the time of its design, the structural frame will have been designed to support Category B, C & E occupancy loads defined by BS 6399 Part 1, i.e.

USE	UDL	POINT LOAD
Offices for General Use	2,5kN/m ²	2,7kN
Areas Without Obstacles for Moving People	4,0kN/m ²	4,5kN
Plant Room, Boiler Room	7,5kN/m ²	4,5kN

As a purpose-built office, the floors will have been designed for an additional uniform load of 1,0kN/m² to allow for partitions.

DESIGN STANDARDS FOR THE PROPOSED USE

When converted to residential use, the structural frame will have to support Category A, C & E occupancy loads, defined by BS 6399 Part 1 or EN 1991-1, i.e.

USE	UDL	POINT LOAD
Self-Contained Dwelling	1,5kN/m ²	2,0kN
Areas Without Obstacles for Moving People	1,5kN/m ²	2,0kN
Plant Room, Boiler Room	7,5kN/m ²	4,5kN

PROPOSED EXTENSION

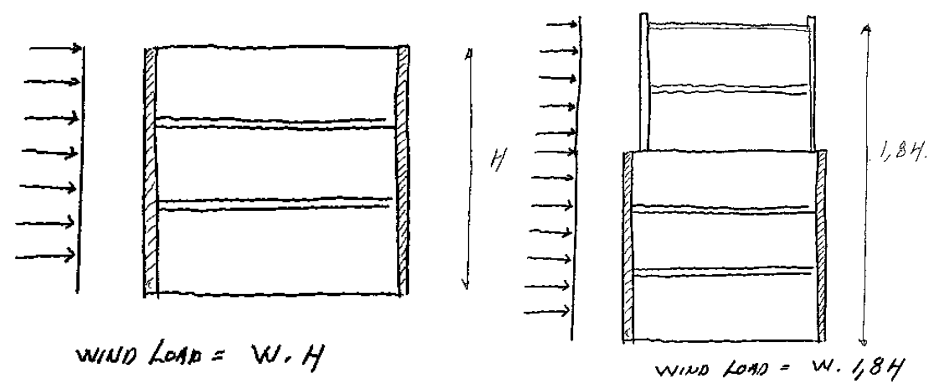
The new extensions will be raised in lightweight construction off the frame at current eaves level. The roof over the central plant room will be removed as will the roof trusses on the east wing and the current finishes to the west wing.

The past and original use of the building will potentially have generated 350kg/m² of occupancy load on the ground, first and second floors and 750kg/m² on the plant room floor, giving a total of 1800kg/m² to the foundations. The proposed use will potentially generate 150kg/m² of occupancy load on ground, first, second, third and fourth floors giving a total to the foundations of 750kg/m², a significant reduction. Allowing for the SFS partitions will potentially add a further 250kg/m².

The construction of the extensions will weigh around 100kg/m² per floor, adding ~250kg/m² to the foundation loads.

The existing foundations will therefore have the capacity to support the new construction and new occupancy so will not require improvement or supplement.

The extended building will be taller so will capture more wind load than the current building, increasing by upto 80%, which will consequently generate larger foundation loads.



While this increase is significant, the nature of wind loading (i.e. short-term and infrequent) and how it combines with the new occupancy loads will not lead to an overall loading greater than the building has experience in the past, or was designed for. Statistically, all of the building will not be fully occupied at the same time so design standards allow the total load to be reduced to reflect this and, for the extended building with five occupied floors, this reduction can be 40% of the total, i.e. 300kg/m².

Number of floors with loads qualifying for reduction carried by member under consideration	Reduction in total distributed imposed load on all floors carried by the member under consideration %
1	0
2	10
3	20
4	30
5 to 10	40
over 10	50 max.

The current building is, as an office, Consequence Class 2a with respect to Disproportionate Collapse so will have been designed and built with “effective horizontal ties or effective anchorage of suspended floors...”. The extended building will be Consequence Class 2b, which requires in addition to requirements for 2a, will need effective vertical ties and it is likely that the existing steelwork connection will fulfil this requirement while the new construction will be similarly detailed.

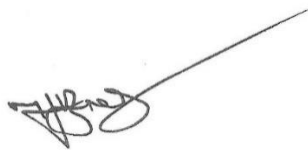
COMMENT & CONCLUSIONS

- Great Brigham’s Mead is a well-designed and constructed building and has been maintained.
- There are no apparent or obvious defects, deficiencies or disruptions in its structure or fabric.
- It has not been used for an occupancy it was not designed for and there is no evidence of distress, over- or undue-loading in the floor slabs or floor beams.
- The permitted development will generate lower occupancy loads than it was designed for or used for so will not adversely affect the performance of the floor beams, columns or foundations.
- The elevations will be retained as they are, and the frame was designed and detailed to support.
- There is no indication in the existing structure that it will not support the proposed change in occupancy
- The structure’s original design, if that followed the correct design standards, is more than capable of supporting the proposed extension.
- The stability of the building will not change or be affected by the change of use and occupancy
- The stormwater run-off will not be increased by the change of use or occupancy
- The construction of the existing structural frame will likely meet the requirements for a Consequence Class 2b building.
- The new construction for the extension will be detailed to meet the requirements for a Consequence Class 2b building.

There are no reasons why the existing structure cannot or will not support the proposed occupancy and extension and there is no requirement to intervene, reinforce or supplement the existing structure or sub-structure for this.

While I hope that this brief report is suitable for your purposes at this stage, do let me know if you require anything further.

Yours sincerely



Malcolm Brady BEng CEng MStructE
For Michael Barclay Partnership LLP